

# OMAC at GM Powertrain

**OMAC Users Group Meeting  
February 11, 1998**

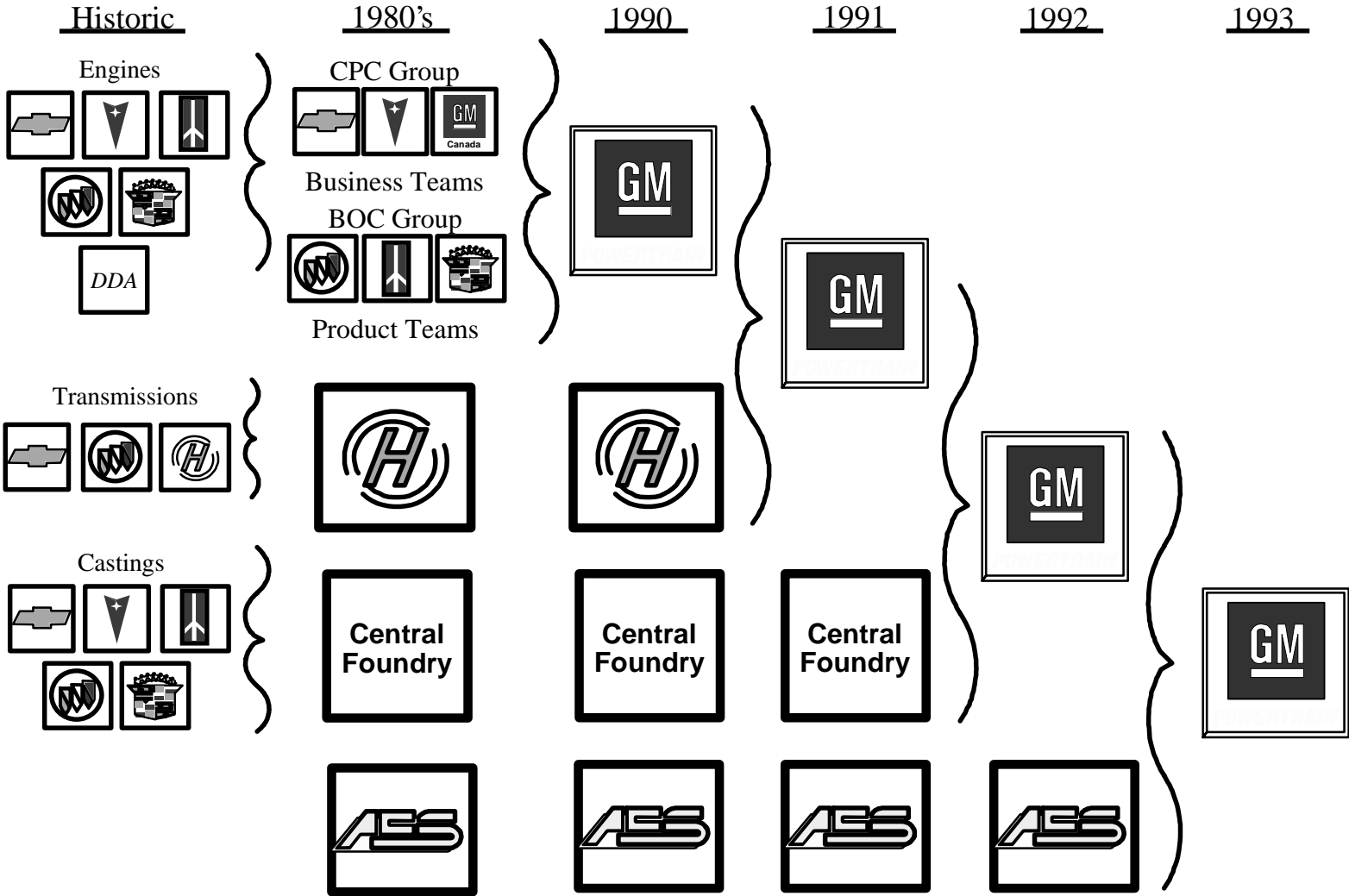
**Jerry Yen**



# Outline

- GMPT Profiles
- Global Control Vision
- Current Implementations & Upcoming Opportunities
- Technical and Business Issues
- Expectations
- Summary

# Evolution of GMPT



# **GMPTG Operational Profile**

- 26 Plant Locations in Four Countries
- 8 Product Engineering Centers
- Approximately 57,000 Employees
- \$12 Billion in Sales
  - Sales of \$650 Million to 46 Non-NAO Customers
- Product Team/Functional Support Structure
- Diverse Product and Process Technology
- Comprehensive Manufacturing Capability

# **GMPTG OMAC Goal**

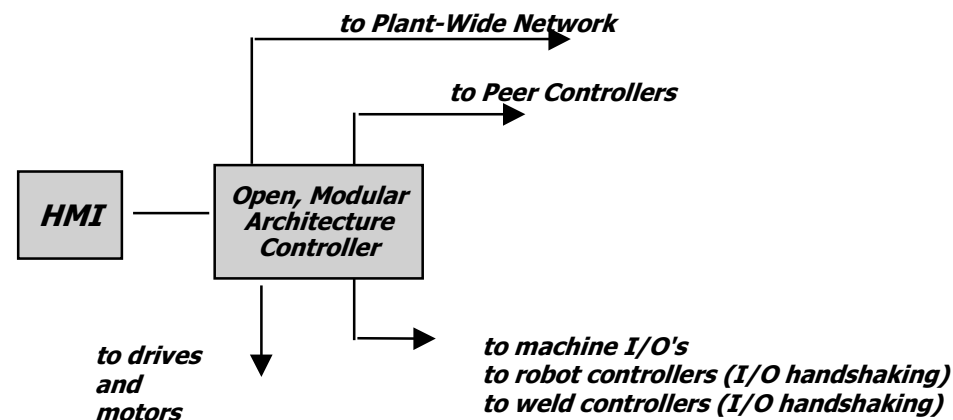
**Enable Cost Effective, Flexible,  
and Agile Manufacturing Systems !!**

# OMAC Definitions

- open:*** allowing the integration of off-the-shelf hardware and software components into a “de facto” standard environment
- modular:*** permitting “plug and play” of components
- scaleable:*** enabling easy and efficient reconfiguration to meet specific application needs
- economical:*** achieving low life cycle cost
- maintainable:*** supporting robust plant floor operation  
maximum uptime - reliable hardware and software  
minimal downtime - expeditious repair and easy maintenance

# OMAC Systems

- OMAC is all about:
  - standard interfaces
  - commercially available components conforming to standard interfaces
  - tools to integrate commercial components
  - support for implementations

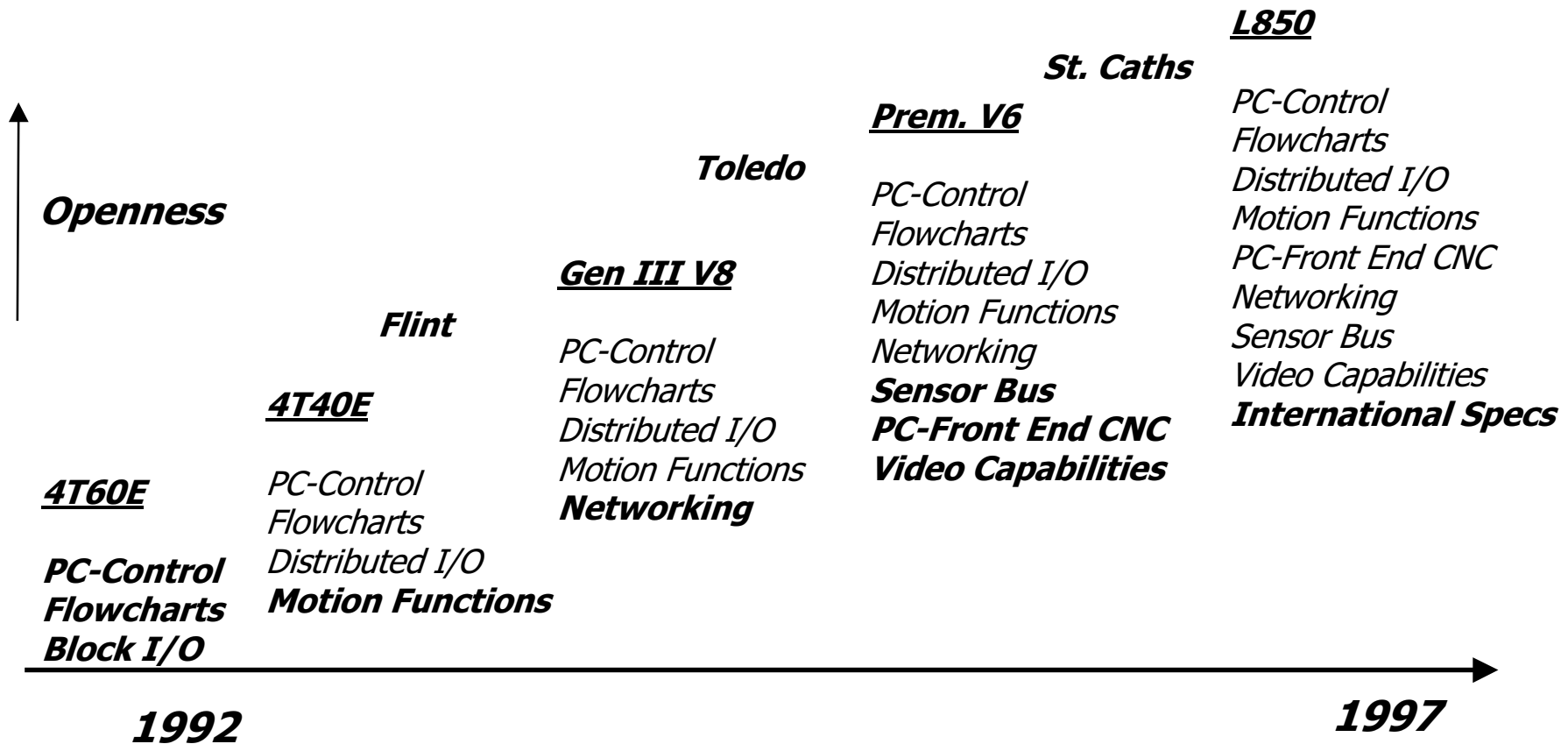


# **GM Powertrain**

## ***Global Control Vision***

- PC-Based Control
- Distributed Architecture
- DC I/O (24 Volts)
- Open Networks
- Common, Integrated Human-Machine Interface
- Common Safety Design Standard
- Standard Based Modular and Transportable Software
- Common Hydraulic Power Unit Design
- Metric Standards for Fluid Power

# GMPTG PC-Based Control *Implementations*



# Migration Strategy

<i>Timing</i> <i>Applications</i>	<i>Current</i>	<i>Near Future</i>	<i>Future</i>
<b><i>Transfer Lines</i></b>	<i>PC Controls</i>	<i>PC Controls</i>	<i>Open PC Controls</i>
<b><i>Assembly Lines</i></b>	<i>PC Controls</i>	<i>PC Controls</i>	<i>Open PC Controls</i>
<b><i>Agile CNC Machining Lines</i></b>	<i>Tier II CNC &amp; PC Controls (Material Handling)</i>	<i>Tier II CNC (PC Front End) &amp; PC Controls (Material Handling)</i>	<i>Open PC Controls</i>
<b><i>Stand-Alone Non-CNC Machining Systems</i></b>	<i>PLC or PC Controls</i>	<i>PLC or PC Controls</i>	<i>Open PC Controls</i>
<b><i>Stand-Alone CNC Machining Systems</i></b>	<i>Tier II CNC or OEM CNC</i>	<i>Tier II, OEM CNC (PC Front End) or Open PC Controls</i>	<i>Open PC Controls</i>

# Upcoming GMPT Programs

- L6 Engine Program
  - Two Modules
- L850 Engine Program
  - European Module
  - Additional N.A. Module
- CVT Transmission Program

# Technical Issues

- Operating Systems
- Hardware Platforms and Implementations
- Discrete Logic, CNC, and Integrated Control Software Packages
- Common API
- Device Level Networks
- Controller - Digital Drive Interfaces
- Application Programming Environment

**GM Will Ride the Technology Wave!**



# OMAC Development Activities

- Manufacturing Systems
  - NIIIP-SMART Program
  - Agile Manufacturing Systems
- OMAC Technology Components
  - OMAC API Project
  - Real-Time Operating System Issues
  - Application Programming Methods
    - CNC and Discrete Applications
  - Networking

# **Business Issues**

- Manufacturing System Integration
- Control System Integration
- Safety Regulations
- Users Responsibilities
- Supplier Relationship

# **GMPT Expectations**

- Partnership in Advanced Product Development Activities
- Joint Pilot Validation Projects
- Cooperative Technology Roll-out and Training Strategies
- Jointly Developed/Supported Market Technology Standards

# Summary

- GMPTG is implementing PC-based control Systems on major programs and is pushing toward implementing OMAC technologies
- International industrial automation market is embracing the OMAC direction
  - Formation of the OMAC Users Group
- Internet/Intranet, real-time Windows NT, component-based software are key technologies that will drastically change the industrial automation paradigms